Claims

1. A process for forming a metal plating film, comprising the steps of:

preparing a base element having a convex curved surface;

depositing a metal plating film onto the convex curved surface of the base element; and

detaching the metal plating film from the base element to obtain the metal plating film.

2. The process for forming a metal plating film according to Claim 1, wherein the base element has a cylindrical surface, and in a step for depositing the metal plating film onto the surface of the base element, a part of the surface of the base element is immersed in a plating solution in a plating bath, and an electric field is applied between the base element and the plating bath, while the base element turns on its axis.

3. The process for forming a metal plating film according to Claim 1 or 2, wherein a mask layer for controlling a deposition area of the metal plating film is formed on the surface of the base element, and the mask layer comprises diamond-like carbon (DLC) or graphite-like carbon (GLC).

4. The process for forming a metal plating film according to any one of Claim 1 to 3, wherein the metal plating film includes

non-conductive micro-particles therein.

5. A process for manufacturing an electronic component, comprising:

a step A for depositing a metal plating film onto a surface of a base element;

a step B for detaching the metal plating film from the base element, and for mutually attaching the metal plating film with a dielectric sheet; and

a step C for obtaining an electronic component having a portion with a conductor layer attached on a dielectric layer by heat treating the dielectric sheet having the formed metal plating film thereon, at a temperature lower than a melting point of a metal forming the metal plating film.

6. The process for manufacturing an electronic component according to Claim 5, wherein the step B comprises a step for detaching the metal plating film from the base element and transferring to a resin film, and a step for attaching a dielectric sheet onto the metal plating film transferred on the resin film.

7. The process for manufacturing an electronic component according to Claim 5, wherein the step B comprises a step for detaching the metal plating film from the base element and transferring to a resin film, and a step for re-transferring, onto

a dielectric sheet, the metal plating film transferred onto the resin film.

8. The process for manufacturing an electronic component according to Claim 5, wherein the step B comprises a step for detaching the metal plating film from the base element, and for directly transferring onto a dielectric sheet of a resin film having the dielectric sheet formed thereon.

9. The process for manufacturing an electronic component according to Claim 5, wherein the step B comprises a step for detaching the metal plating film from the base element and transferring to a resin film, a step for attaching a dielectric slurry so as to cover the metal plating film transferred to the resin film, and a step for heating and drying the resin film having the dielectric slurry attached thereto.

10. The process for manufacturing an electronic component according to Claim 5, wherein a peak temperature in heat treatment in the step C is higher than a recrystallizing temperature of the metal forming the metal plating film.

11. The process for manufacturing an electronic component according to Claim 5, wherein the step B comprises a step for selectively attaching the dielectric sheet to a region without

existence of the metal plating film of the resin film, by pressing the dielectric sheet having a thickness almost equal to a thickness of the metal plating film onto both of the region with existence of the metal plating film and a region without existence in a surface having the metal plating film formed on the resin film, after detaching of the metal plating film from the base element and transferring to the resin film.

12. The process for manufacturing an electronic component according to any one of Claim 5 to Claim 11, wherein the base element has a cylindrical surface, and in the process A, a part of the surface of the base element is immersed in a plating solution in a plating bath, and an electric field is applied between the base element and the plating bath, while the base element turns on its axis.

13. The process for manufacturing an electronic component according to any one of Claim 5 to Claim 12, wherein a mask layer for controlling a deposition area of the metal plating film is formed on the surface of the base element, and the mask layer comprises diamond-like carbon (DLC) or graphite-like carbon (GLC).

14. The process for manufacturing an electronic component according to any one of Claim 5 to Claim 13, wherein the plating solution comprises non-conductive micro-particles, and in the process A the metal plating film comprising non-conductive

micro-particles is formed by attachment of the non-conductive micro-particles to a metal component deposited on the surface of the base element.

15. An apparatus for forming a plating film comprising:
a plating bath having a plating solution introduced therein;
a rotatable base element having a cylindrical surface, the base element being disposed so that a portion of a surface thereof may be immersed in the plating solution;
an electric field applying means for applying electric field between the base element and the plating bath; and
a transfer means for pressing a metal plating film onto a surface of the base element elevated out from the plating solution, by pressing a transfer recipient material to the base element, in a downstream side of a rotative direction of the base element.

16. The apparatus for forming a plating film according to Claim 15, wherein the transfer recipient material is a resin film, further comprising a second transfer means for attaching a dielectric sheet onto the metal plating film transferred on the resin film.

17. The apparatus for forming a plating film according to Claim 15, wherein the transfer recipient material is a resin film, further comprising a third transfer means for transferring the metal plating film transferred on the resin film onto a dielectric sheet.

18. The apparatus for forming a plating film according to Claim 15, wherein the transfer recipient material is a resin film having a dielectric sheet formed thereon.

19. The apparatus for forming a plating film according to Claim 15, wherein the transfer recipient material is a resin film, further comprising a slurry attaching means for attaching a dielectric slurry so as to cover the metal plating film transferred to the resin film, and a heating and drying means for heating and drying the resin film having the dielectric slurry attached thereon.

20. The apparatus for forming a plating film according to any one of Claim 15 to Claim 19, wherein a surface of the base element is sectioned into a plurality of blocks detachably supported to a core part of the base element.

21. The apparatus for forming a plating film according to any one of Claim 15 to Claim 20, wherein in the plating bath, there are provided a first electric potential area maintained in a comparatively positive electric potential with respect to the base element for depositing a metal plating film onto a surface of the base element, and a second electric potential area for re-dissolving, into the plating solution, a surface portion of the metal plating film deposited onto the surface of the base element, the second electric potential area being disposed in a downstream

in a rotative direction of the base element of the first electric potential area, and being maintained in a comparatively negative electric potential with respect to the base element.

22. The apparatus for forming a plating film according to Claim 21, wherein the first potential area and the second electric potential area are electrically isolated by interposition of an insulating member.